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SUNDRY CIVIL APPROPRIATION BILL, 1922

NITRATE PLANT AT MUSCLE SHOALS

HEARINGS

BEFORE THE

SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS UNITED STATES SENATE

SIXTY-SIXTH CONGRESS
THIRD SESSION

ON

H. R. 15422

A BILL MAKING APPROPRIATIONS FOR SUNDRY CIVIL EXPENSES OF THE GOVERNMENT FOR THE FISCAL YEAR ENDING JUNE 30, 1922 AND FOR OTHER PURPOSES

Printed for the use of the Committee on Appropriations

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SUBCOMMITTEE ON SUNDRY CIVIL APPROPRIATION BILL, 1922.

FRANCIS E. WARREN, Wyoming, *Chairman.*

REED SMOOT, Utah.
WESLEY L. JONES, Washington.
CHARLES CURTIS, Kansas.
ASLE J. GRONNA, North Dakota.
LEE S. OVERMAN, North Carolina.
ROBERT L. OWEN, Oklahoma.
CARTER GLASS, Virginia.

KENNEDY E. REA, *Clerk.*

SUNDRY CIVIL APPROPRIATION BILL, 1922.

WEDNESDAY, JANUARY 12, 1921.

UNITED STATES SENATE,
SUBCOMMITTEE ON APPROPRIATIONS,
Washington, D. C.

JUL 17 1942 FCR

The subcommittee met, pursuant to call, at 10.30 o'clock a. m., in the committee room, Capitol, Senator Francis E. Warren presiding.

Present: Senators Warren (chairman), Smoot, Jones of Washington, Curtis, Gronna, Overman, Underwood, Owen, and Glass.

NITRATE PLANT AT MUSCLE SHOALS.

The CHAIRMAN. Gentlemen, we have an amendment to the sundry civil bill, introduced by the Senator from Alabama, Mr. Underwood, to make an appropriation of $10,000,000 for the nitrate plant at Muscle Shoals; and we have before us Col. Cooper, who will address the committee on this subject.

Senator UNDERWOOD. Mr. Chairman, I thank the committee for giving us this hearing. I do not care to say anything myself now. When Col. Cooper has finished his main testimony I should like to have the privilege of asking him a few questions, to bring out some points that I want to demonstrate to the committee about the surroundings there, and I may desire to say a few words myself. I should like to ask Col. Cooper to make his statement along his own lines.

STATEMENT OF COL. HUGH L. COOPER.

Col. COOPER. Mr. Chairman, I do not know that I am correctly informed as to just what I am expected to talk about.

I am the consulting engineer of the Government on the building of this dam at Muscle Shoals. My responsibilities relate to the designing of the work and the carrying of it out, in the sense of seeing that all of the plans and specifications are faithfully executed, the actual construction of the work being done by the United States Government. We report to the Chief of Engineers, and all the work that we do is under his direction.

As far as the nitrate question goes down there, I am not in accord with the views of the Secretary of War or the Chief of Engineers, as I understand it. I do not believe that the plant ought to be for fertilizer.

The CHAIRMAN. You have directed your attention to the line of water power and the amount of power possible to be derived from the dam?

Col. COOPER. Yes; and I thought possibly the first thing that might be of interest would be to give you an idea of what the work is going to look like when it is finished.

Senator JONES of Washington. I should like to get your views on the line you have just suggested before you go into that, with the permission of the chairman.

Col. COOPER. All right.

Senator JONES of Washington. You started to make a statement of your views.

Col. COOPER. Yes. I think this dam has potentialities in it that are very important to a large portion of the South, but I think it would be a great mistake to assign those potentialities to a Government fertilizer plant. I am one of those who hold the belief that to put the Government of the United States into business is very bad business. I think they ought to stay out of it. I think the way to get cheap fertilizer from this plant—that is, eventually to find out if that is the better use than general distribution of the power—is to finish the dam and then put the current up to competition and find out whether the best interests of the public lie along the fertilizer end or the power-distributing end.

There is a tremendous amount of energy behind this dam. I think, perhaps, I can give you a better idea of the amount of this energy by telling you that when this structure is completed the amount of energy that will be created will be about two and one-half times that created at the Keokuk Dam. The Keokuk Dam, up to this date, is one of the biggest in the world, if not the biggest.

Senator JONES of Washington. What is the amount of energy created by the Keokuk Dam?

Col. COOPER. Two hundred thousand horsepower. I happen to be vice president of the company there, and happened to build that plant.

This plant at Muscle Shoals will have about 550,000 horsepower installed, and usable at about the same rate of use as our 200,000 horsepower at Keokuk. So that it has a very strong power element in it. I think it would be a great mistake to take this tremendous amount of energy and say at this time, "We will just use it for one thing." I think you should say, "We will create this energy, and when we get it created we will put the whole matter up at auction, so to speak, and we will find out where the greatest good to the greatest number will come from."

Senator JONES of Washington. I thought you were going to state whether or not you thought the Government should put it in; and if so, that you would give the reason for thinking that the Government should put it in.

Col. COOPER. That the Government should build the project?

Senator JONES of Washington. Yes.

Col. COOPER. That is what I am going to do now. From careful investigations which I have made I find that the current from this dam can reach a territory of about 60,000 square miles, and that will affect people in seven States. Now, by the time the existing appropriations are exhausted there will be $17,000,000 in this plant, and the real question before the committee, as I take it, is whether they are going to stop at the end of the $17,000,000 and do nothing more

or whether they are going to end up the work for three years, or indefinitely.

Senator JONES of Washington. There is not $17,000,000 spent now?

Col. COOPER. I think about $11,000,000 or $12,000,000.

Senator JONES of Washington. Is the other under contract?

Col. COOPER. No; it is not under contract.

Senator JONES of Washington. We could stop now, could we not?

Col. COOPER. I do not think you could.

Senator JONES of Washington. If we thought that was a wise thing to do?

Col. COOPER. I do not know whether you can call back the appropriation or not. That is for you to say.

Senator JONES of Washington. Of course we can call back an appropriation that is not obligated by contracts.

Senator UNDERWOOD. There are contracts out for some of this machinery?

Col. COOPER. Yes; about $1,300,000 out for machinery.

Senator JONES of Washington. We could stop four or five million dollars.

Senator SMOOT. What do you think this thing could be sold for by the Government to a private concern?

Col. COOPER. I do not believe we would get much of anything for it in the present state of it, because the rate of interest that would have to be applied to the project would be so low that private people would not go into it. I think if you tried to sell it now you would lose $10,000,000.

Senator SMOOT. Out of $11,000,000?

Col. COOPER. No, I do not think you would lose $10,000,000 out of the $11,000,000. I think you could get $3,000,000 out of it.

Senator CURTIS. You might get $3,000,000 out of $11,000,000?

Col. COOPER. Yes; you might not even get that; and when the work would be resumed I do not know, because private capital on a 5 per cent basis will not be found for a long time to come.

Senator SMOOT. It would not have to be on a 5 per cent basis.

Col. COOPER. I do not know that it would, but it would be a low rate on the amount of money that would be required for private capital to go on and finish it.

Senator OVERMAN. How much would it take to complete it?

Col. COOPER. From now?

Senator OVERMAN. Yes.

Col. COOPER. If there are $11,000,000 in it now, it would take $39,000,000 more to complete it.

Senator SMOOT. It would cost $42,000,000 if private parties paid $3,000,000 for it, and put in $39,000,000 more?

Col. COOPER. Yes; and I do not think you would find private capital putting up $42,000,000 on that project in 10 years.

Senator SMOOT. Why not?

Col. COOPER. Because in order to sell its current and distribute it over a wide field it has got to have the money at about 5 per cent interest, and when you get through, I think you will find that the real interest of the Government of the United States and the large area of population down there is in the direction of having the Government go ahead and finish this thing.

I have already stated to Senator Smoot and Senator Underwood one thing that I would like to state to the full committee, and that is that I have not a dollar's interest in this at all. I am working for the Government of the United States without any profit of any kind.

Senator SMOOT. You get a dollar a year?

Col. COOPER. I get a dollar a year, but I have not got that yet, and my contract for service to the Government is cancelable on either side on 30 days' notice, so that I am not speaking to you at all as a person who has any financial interest, and it would be a great relief to me to have it canceled.

Senator OVERMAN. You say this will furnish power to seven States?

Col. COOPER. Yes.

Senator SMOOT. You do not believe we ought to finish this water power for the purpose of going into the manufacture of fertilizer, do you?

Col. COOPER. I think that would be an awful mistake.

Senator SMOOT. What you think is this, that the Government ought to construct this power dam, finish the same, and lease the power out?

Col. COOPER. That is exactly it.

Senator SMOOT. You think it can be done and bring to the United States a return?

Col. COOPER. I am very sure of that.

Senator SMOOT. That is what your letter said to me.

Col. COOPER. Yes; and that is a practical thing, and it is a thing that I do not think the Government would be taking any chances on at all.

Senator JONES of Washington. Do you, as representing the Government, think this plant could be maintained and pay the expenses of operating it?

Col. COOPER. Yes; and get a net 5 per cent return without assuming any obligation at all.

Senator JONES of Washington. Five per cent on what?

Col. COOPER. On what the job will have cost us when it is finished.

Senator JONES of Washington. On $50,000,000?

Col. COOPER. Yes.

Senator SMOOT. The water power of it?

Senator JONES of Washington. And then let the people who distribute it make a profit?

Col. COOPER. Yes; I have figured the price for the current so low that it would be attractive to many different lines of industry.

Senator SMOOT. I wish they would put our power plants in Utah on such a basis that we could get that rate.

Senator JONES of Washington. If it is such a desirable proposition as that, and would pay the Government 5 per cent, and then pay the private parties a profit, I do not see why private capital would not like to go into it.

Col. COOPER. Because private capital can not go in on a 5 per cent basis. The Government is the only agency that can produce the money for 5 per cent. Private capital is making 8 and 10 per cent on its investments now.

Senator SMOOT. We can not get it now.

Col. COOPER. That is the rate we are figuring.

Senator OVERMAN. You mean that when the Government has completed the dam it can lease its power at such a rate that it will pay the Government 5 per cent?

Col. COOPER. Yes; and pay all the expenses of operation and the upkeep expenses as well.

Senator JONES of Washington. If there should be nobody ready at the time to lease it the Government would have to go on operating it and sustain it.

Col. COOPER. I have got to the point which, I think, is very important and which I touched upon in my letter to Senator Smoot. That is this: The whole southern territory is at the mercy of this project. A great many different water powers in the South are ready for development at this time, but no private capital will go in there until the policy of the Government with respect to this energy at Muscle Shoals is defined.

Senator JONES of Washington. That is, there are water powers that will serve the territory that would be served by this?

Col. COOPER. No; there are water powers in that territory that could serve that territory in conjunction with this or that could go it alone; but, until the price and the policy with respect to this structure are determined, private capital will not go in, because nobody knows what they are going to do.

Senator SMOOT. From your letter I judged that there are a number of industries that are ready to put the power in, but they can not go to work and put it in if the Government is going to construct this project and sell power at a cheaper rate than they can.

Col. COOPER. That is it exactly.

Senator OVERMAN. Is South Carolina included in these seven States?

Col. COOPER. Yes.

Senator OVERMAN. There is great development there.

Senator SMOOT. Water powers can be developed in a great many places.

Senator OVERMAN. I mean the development in North Carolina and in South Carolina.

Col. COOPER. It is only a small corner of South Carolina, but there are 60,000 square miles.

Senator JONES of Washington. If this power was developed, then it would very likely prevent the development of other water powers in the territory covered by this that would be developed if this was not taken up?

Col. COOPER. No; it works just the other way. If this water power is developed it makes possible a lot of water power in the South, in this same territory, that can not be developed at all otherwise, because this power will furnish a given number of kilowatt hours, which, if put into some storage proposition somewhere else, will create energy at a less price than either one of them can create it alone.

Senator JONES of Washington. For their own use?

Col. COOPER. Yes; for their own use, but when I say their own use, I mean it will be regulated as to price, service, etc.

Senator SMOOT. I think you misunderstood the question of the Senator, because your answer is virtually, as I understood it, and is

virtually as you said before and that is this: That if this is developed the other private projects that are now under contemplation will not be completed?

Col. COOPER. No; they will not be completed. There will be nothing done in this territory.

Senator JONES of Washington. That is what I understood.

Col. COOPER. I misunderstood you.

Senator JONES of Washington. I thought you stated just the opposite.

Col. COOPER. No.

Senator JONES of Washington. I thought the development of this would lead to the development of the other enterprises.

Col. COOPER. No.

Senator JONES of Washington. And furnish them power which they could use in connection with that.

Col. COOPER. Let me see if I can state exactly what is in my mind.

Senator JONES of Washington. Senator Smoot has just stated what I had in mind would be the result.

Col. COOPER. That is the situation as I see it: There are a lot of water powers in the South that ought to be developed in the territory that can be served by this plant. None of those powers will be developed until the policy with respect to the Muscle Shoals plant is known, because it might very well happen that a policy would be adopted that would call for the sale of the energy from the Muscle Shoals Dam at cost, for instance, and no private capital would undertake to go into competition with the United States Government in a matter of that kind. Now, supposing that the Government finally decides to go ahead and finish this plant and lease it to private capital. Then this plant will stimulate a great many plants and bring about the construction of a great many plants that would not otherwise be built at all, and at the same time those that could be built independently would also be constructed by private capital.

Senator UNDERWOOD. In other words, the construction of this dam would develop the building of water power throughout that entire territory.

Col. COOPER. Oh, yes; it is really the key to the whole situation.

Senator JONES of Washington. I think it would be, if it is handled in a certain way, but suppose there is nobody to lease this and that conditions are such that when it is built it would not be leased and the Government goes on running it. If the Government runs it without the idea of making a profit, would there be any other development?

Col. COOPER. The answer to that is this, that the South has already a very great need for additional power. There are 10 or 12 distributing companies in the South.

Senator JONES of Washington. In this territory?

Col. COOPER. Yes; in territory that applies here that are anxious to build right now. Some of them have approached me and tried to get me to become their consulting engineer. I have told them I could not serve them now or at any time in the future. If I have got to stay with this thing, I propose to be free from any financial interest in the future, and have told them that even after this plant is built I would not take any business down there, so that I think I am in a position to say that when the plant is built the Government will be in a position, because of the great demand for hydraulic power in that territory, to dictate its own price and will never be at the mercy of these other fellows. Just the minute this think is finished the Government can say "unless you gentlemen agree to take this energy at these prices that will give us 5 per cent we will turn this thing over to a public instrumentality, financed with public money, that will sell in your own territory theoretically at a very much less price," and with a club like that over them you will not have any trouble at all.

Senator JONES of Washington. The others will be at the mercy of the Government.

Col. COOPER. Yes.

Senator JONES of Washington. Is anybody going to put any money into a proposition like that?

Col. COOPER. If the deal is made on a perfectly fair basis, there is always a fair way to do these things.

Senator JONES of Washington. Has it been your experience that the Government ever did these things on what you call a fair basis?

Col. COOPER. No; I do not think so.

Senator SMOOT. Then this is a project to encourage the development of industries by giving them cheap power?

Col. COOPER. Yes; and this Government can control the cheap power, and in doing so the territory can be developed, and, in my judgment, you can safely count on getting a net 5 per cent interest.

Senator OVERMAN. When it is completed and the power furnished, what is the trouble about furnishing the chemicals necessary for fertilizer?

Col. COOPER. There is no trouble about it at all; but I would not decide now which was the best way to use this energy. It is too far away. Suppose, for instance, that you decided to say that you were going to do something along the chemical lines. This plant will not be finished for three years. At the end of three years there might be a great deal better chemical use than you have to-day. I do not believe in selling anything until you have got something to sell.

Senator JONES of Washington. In your judgment, what is the use that justifies the Government in putting in that plant, aside from the money that it now has in it?

Col. COOPER. I do not think there is anything, except that it would be a great benefit to the people all over the South. It would be tremendous benefit to the people of the South.

Senator UNDERWOOD. May I ask Col. Cooper a question right there?

The CHAIRMAN. Yes.

Senator UNDERWOOD. Of course, this improves the navigation of that river?

Col. COOPER. Yes.

Senator UNDERWOOD. And that is included in your estimate of cost?

Col. COOPER. Yes.

Senator SMOOT. You would not spend all that money for the little navigation you would have there?

Col. COOPER. No.

Senator UNDERWOOD. But if this were completed and the Government received the 5 per cent on its money, which is more than it pays for the use of the money, it would have furnished the improved navigation of that river without cost to the Government.

Col. COOPER. Yes; you can get that.

Senator UNDERWOOD. Do you not regard that a great power of this kind is a reserve war power of the Government that could be used in time of war if another emergency faced the country like the one in 1917?

Col. COOPER. Yes; I think so, but I think you can always commandeer these powers.

Senator UNDERWOOD. It is true, but to commandeer would cost more money than if we owned it and had our own control?

Col. COOPER. Yes.

Senator UNDERWOOD. And I assume that this power at the dam could be sold to the Government, if it wanted to do it in that way, under a contract that would give the Government the right to take it back in time of war.

Col. COOPER. Yes; absolutely. That would not interfere with the 5 per cent at all.

Senator UNDERWOOD. So that the Government interests outside of what might be developed in that country, would be that you have a great reserve power of electricity in time of war, and you make a navigable river without cost to the Government?

Col. COOPER. Yes.

Senator JONES of Washington. In that connection, is it not the expectation that under the water-power act we will have water-power development all over the country that will be available in case of war, for use for various purposes?

Col. COOPER. I think so; I would not say, however, of this magnitude.

Senator JONES of Washington. Not as large as this?

Col. COOPER. No.

Senator SMOOT. Even if this were in private hands, the Government of the United States could commandeer it if it wanted to?

Col. COOPER. Yes.

Senator SMOOT. And if it does not appear that the expense is greater than it is at many industries that the Government has commandeered, it would be cheaper for the Government to do that than it would be to own it.

Senator UNDERWOOD. Let me ask a question there. How much of the initial cost that is chargeable to a plant in its operation is due to the interest on the money invested, and how much to working cost?

Col. COOPER. I think it is about half and half, when you get all through. I have figured that the energy would be sold to produce a gross income of 10 per cent of the cost of the plant, of which 5 per cent would be absorbed by depreciation and upkeep and operation and taxes, etc., and the other 5 per cent would go to the Government.

The CHAIRMAN. I understand your argument so far as in the line of production of water power, etc. What would be your estimate if we had not commenced this at all? How would you figure on it? In the conclusions which you have reached are you figuring that we have already spent a large amount of money, and having expended that, are you figuring more upon the difference between what has been expended and what is to be expended than upon the cost of the whole? I should like to have you explain that a little.

Col. COOPER. All right. On the basis that the Government had not done anything to this plant, I do not believe that any man at this table would ever see the time when private capital would undertake this project.

The CHAIRMAN. It is the money already spent that you think makes it desirable now?

Col. COOPER. Yes; and I think also that at any time in the future that this great power was made available, it would have to be made available by Government money.

Senator SMOOT. Why so? For instance, take some of the water-power plants out West that have been carrying power from Idaho clear to Utah—from the northern part of Idaho to the southern part of Utah, 400 miles. The expenditure on it is very small compared to this. I do not see why private capital would not develop that power there if there is a demand for it?

Col. COOPER. Your "if" is very important. We figure that it will take 10 years to market this power, and I have figured interest during the interim; but the price that we are figuring here is so much lower than the price you get out in Utah that I do not think the thing is quite comparable.

Senator SMOOT. The proposition then is for the Government to give the people of the South cheap power?

Col. COOPER. Yes; and I think that it will give that.

Senator SMOOT. And the people of the West can get their own money and put it in, and pay any price they want to for their power?

Col. COOPER. That is the situation as I see it; that this is a project that can not be developed by private money.

Senator UNDERWOOD. Let me ask you a question. I do not want to interrupt you.

Col. COOPER. Go ahead.

Senator UNDERWOOD. But if private persons desire to develop this dam they would have to pay a good deal more in the way of interest for their money than the Government pays for interest on its money?

Col. COOPER. Yes.

Senator UNDERWOOD. Would not that cut a good deal of a figure?

Col. COOPER. That is the whole thing, the controlling thing.

Senator SMOOT. Then the Government should go into everything. The Government of the United States could borrow money cheaper, and therefore ought to go into everything.

Senator UNDERWOOD. The Government is in this, and the question is whether it should continue it. And I want Col. Cooper to explain why he thinks the Government should do this, rather than private capital?

Col. COOPER. If it were put on the basis of raising this money from private capital the amount the job would finally cost would be prohibitive, when you come to figure the cost of the energy. By the time you distributed it, it would not be a profitable investment.

Senator JONES of Washington. Our usual experience is that Government estimates are always exceeded very largely in carrying out work.

Col. COOPER. Yes.

Senator JONES of Washington. What do you think is likely to be the result in this case? Will this $50,000,000 estimate take that into account, or is it likely to be $100,000,000 instead of $50,000,000?

Col. COOPER. It is utterly impossible for it to be $100,000,000. My contract with the Government does not make me responsible for the cost of the work.

Senator JONES of Washington. You know the way the Government carries on work?

Col. COOPER. Yes, I know; and they are carrying on this work. The Government estimates of the cost of this work is $45,000,000.

Senator JONES of Washington. That is the Government estimate?

Col. COOPER. Yes; and my estimate is $50,000,000.

Senator JONES of Washington. I thought you were the consulting engineer of the Government.

Col. COOPER. Yes; but I have nothing to do with the cost estimates.

Senator JONES of Washington. You have not?

Col. COOPER. No, sir.

Senator JONES of Washington. You think it will not run to $75,000,000 or $100,000,000?

Col. COOPER. No, sir. It is impossible for it to do that.

Senator SMOOT. Take the reclamation projects of the West. I do not believe there is a single one of them where the actual cost has not doubled the estimates of the Government, and in some cases the project has cost two and one-half times the estimate.

Col. COOPER. I am very glad you have brought up that subject, because I think perhaps I can tell you some things that I personally know that will lay that ghost.

Senator JONES of Washington. It is not a ghost so far as the reclamation proposition is concerned.

Col. COOPER. It is a ghost—not the Government paying high prices, but this question of the cost of a piece of work that is not finished. The $45,000,000 estimate of the Government is based upon unit costs that have already been developed on the job. They are not estimates at all. They are based upon fixed plans from which we know absolutely what the cubature is, and that number of yards have been multiplied by costs that have already been demonstrated by the Army engineers, and we had access to those things, and are quite sure they are correct; and as far as the machinery goes, the estimates of the engineers are based upon prices that have already been made, so that there is practically no risk on the amount you talk about in this job at this time. The drawings are completed. The drawings that I show you—I mean to say the designs are completed all the way through. This drawing I show you is made from mechanical drawings, and the question of the foundations have been so thoroughly proved out that I do not believe it is possible that there can be any such overrun as you speak of. It is not possible for it to be there.

Senator SMOOT. I have a great deal of confidence in your judgment as an engineer, as no doubt you are aware, and perhaps in this case the estimates are based upon a little better knowledge than were the estimates on every reclamation project that we have had in the United States.

Col. COOPER. You see we know what these foundations are.

Senator SMOOT. If they are not based on better knowledge, then the $45,000,000 might run over $100,000,000.

Col. COOPER. We know what these foundations are all the way across. I have here a panoramic view, not very well prepared, but

it is the best one we have. Here is the south shore. Here is the cofferdam. Here is the water, coming through here, and all the foundations from this point to that point are absolutely known. In other words, we know now what 95 per cent of those foundations are, and it is in a laminated limestone country, where it can not possibly change in this upper part.

Senator SMOOT. Take one of the reclamation projects in Utah. It was a proposition of cutting a tunnel through a mountain for about 2 miles. The estimates upon that were based upon the drilling, which turned out to be absolutely correct. They had no trouble whatever about that. They knew just exactly what they had to meet; and yet the cost was two and a half times more than the estimates.

Col. COOPER. That was in the unit prices going along with the estimates; but here we are figuring on absolutely demonstrated unit prices.

The CHAIRMAN. Are you figuring the cost upon what you may expect may be the cost of materials and labor, or on what the actual cost of material and labor have been for the last year or two?

Col. COOPER. We are figuring on the existing cost of material and labor. I am glad you brought up that question, Senator Warren, because I know the engineers are figuring on existing costs, and they are gradually and sensibly being reduced from day to day.

The CHAIRMAN. But they have not reached the bottom by any means?

Col. COOPER. No.

The CHAIRMAN. The Senator from Utah has stated that the costs of reclamation projects have run up. Unfortunately for the Government, those estimates were made at very much lower prices than the rates of material and labor, even before the war.

Col. COOPER. Yes.

The CHAIRMAN. Of course, that carried them up to a certain point; and the ones that were estimated later seem to have been unfortunate also.

Senator SMOOT. On the project out at Strawberry they asked for bids to do that work, and on receiving the bids they thought they were too high, and then the Government went on and did the work itself, and it cost two and a half times more than the bids were.

Senator JONES of Washington. Has it not always been true as a general proposition, under normal conditions, that the cost of Government work exceeded the estimates?

Col. COOPER. Yes.

Senator JONES of Washington. For public buildings and all that sort of thing?

Col. COOPER. Yes. The Panama Canal was originally estimated to cost $140,000,000, and it actually cost $310,000,000 for the same items. Those facts do not apply to this case, because this is not an estimate of something in the future.

Senator JONES of Washington. But is it not inherent—almost necessarily—in the Government doing things like that?

Col. COOPER. Yes, it is; but it often happens very largely even in private practice.

Senator JONES of Washington. Yes, I know; but is not that generally true of the Government—the kind of men you get in charge

of the work and the legislative restrictions that are about them—that they can not deal with the work as they would if it were their own.

Col. COOPER. That is all true; but in this case the Government agency is already selected and installed and has produced the unit costs, which I have checked up, and that collectively brings it up to about the $45,000,000 estimate. Now, I have added for my own personal thought in the matter another $5,000,000, and I think it will cost $50,000,000.

Senator JONES of Washington. What is the Government agency you speak of as already installed?

Col. COOPER. The Corps of Engineers.

Senator JONES of Washington. That is a changing body.

Col. COOPER. That can not change while this job is on.

Senator JONES of Washington. Will the same man be on this work doing this job?

Col. COOPER. I think so. It can be fixed so that the same man will be.

Senator UNDERWOOD. Col. Cooper, the estimates were based on existing war prices for labor and material?

Col. COOPER. Yes.

Senator UNDERWOOD. If there is a reduction in the war prices as this work goes on it will have a tendency to reduce the cost, will it not?

Col. COOPER. Yes; but that question came up yesterday in a conference with the Chief of Engineers and Gen. Taylor, and I told them that in my 27 years' experience I never liked to talk about reducing costs until the work was over.

Senator SMOOT. Particularly when the Government did the work I would not guarantee, for $10,000,000, that it would be done for this amount.

Senator UNDERWOOD. Are they not buying cement at much lower figures than those on which the estimates were based?

Col. COOPER. At least $1.50 a yard, and no account of that has been taken in this estimate at all.

Senator UNDERWOOD. That would make a considerable reduction in the cost itself.

Col. COOPER. It would make only $2,000,000 difference. I do not believe that the committee would be justified in taking an adverse view of this project with any idea that it would cost any less than $50,000,000. I am quite confident that that would be a mistake. There has been too much work done, and there is too much of specific accomplishment behind it, to permit of any such adverse idea as that.

On the question of estimates, I should like to say that I understand that over in the House somebody said my estimates at Keokuk overran 75 per cent, or something like that. For the information of the committee and as a matter of record, I should like to say that the estimated cost per hour power at Keokuk came out within 1¼ per cent of the actual cost.

The CHAIRMAN. Has this work proceeded to a point where you can reckon the percentage of completion as they do on such projects as public buildings.

Col. COOPER. Yes, it has; and I think the percentage of work done is the same percentage that the amount expended up to date is of the total estimate.

Senator SMOOT. Which estimate; the last estimate or the first?

Col. COOPER. The last estimate.

Senator SMOOT. The first one was ridiculous. That was in order to get the first appropriation, and get it started.

The CHAIRMAN. The reason I asked that question was because I supposed that in the initial proceedings the percentage of completion would be at a higher cost?

Col. COOPER. Yes; but in the estimates, Senator, the prefatory work that has already been done has been distributed over the total.

Senator OVERMAN. You have stated that you would not advise the expenditure of this money for the purpose of furnishing fertilizer to the whole country and nitrogen in time of war, but your argument is to finish it for the purpose of furnishing power to seven Southern States. The argument on the floor has been that we want fertilizer for the whole country, for all the factories of the whole country. How do you explain that?

Col. COOPER. I am not a fertilizer expert, but just a plain, ordinary business man, and I want to say this, that I would not commit myself to fertilizers or to power or anything else at this time. I would wait until I was approximately ready to do business with somebody and then I would find out what is the best interest of the South. As I take it this is distinctly a southern proposition, and a great many people of the United States are vitally interested in what this power can do, and two years from now, or two years and a half from now, when we are approaching the time when a definite policy ought to be formed, then let the Government find out by competition—I believe in competition—whether it is the best thing to do to go into the fertilizer business or to go into the general power-distributing business. I do not think this is the right time to fix exactly what they are going to do with something that is not ready to function for three years or more.

Senator SMOOT. You do not think that the Government will ever make a success of going into the fertilizer business, do you?

Col. COOPER. I am very much opposed to it. I think it would be a great mistake. I do not think any future condition could ever arise that would ever justify the Government of the United States in embarking in the fertilizer business or any other business.

Senator UNDERWOOD. The main point I want to bring out, and I think you have already stated it, is this: Your investigations assure you, as far as an engineer can know and be sure of anything, that this dam can be built within an initial cost of $50,000,000?

Col. COOPER. I think that is correct.

Senator UNDERWOOD. And that includes all the machinery for the manufacture of the electricity?

Col. COOPER. Yes.

Senator UNDERWOOD. And with that machinery installed, and within the $50,000,000, at what rate could the Government sell the electricity at the dam and pay the Government 5 per cent on its $50,000,000? I am not talking about the distributing wires, but I mean to sell it at cost at the dam. What could the Government sell it at per horsepower?

Senator SMOOT. That is, you mean with the private interests running their own transmission line?

Senator UNDERWOOD. That is not the question. I am talking about what it would cost the Government to sell the current at the plant, either to the Government itself for its own agricultural work, or powder plant, or to private persons; I want to know for what it could sell that power at the dam, basing the cost on the $50,000,000, and charging 5 per cent interest on the cost at the dam. What could the power be sold for without loss to the Government, including in that the operation of the dam and the locks?

Senator SMOOT. How much per horsepower per year?

Senator UNDERWOOD. How much per horsepower per year?

Col. COOPER. That is probably as important and practical a question as could be asked. The answer to it is rather difficult, because you would have to know what the rate of use per day of the power would be before you could make a definite answer to the Senator's question. People do not understand what the load factor is in this sort of thing; the difficulty in figuring the power price, especially when a dam has storage behind it; such as this one has, is the fact that the rate of the use of the power each day is not the same each hour. For instance, I think in this particular territory the average use of this power would be around 12 hours a day, which would be half the day, or a 50 per cent load factor. Fortunately, because we have this big pool behind us, you can accommodate the output to whatever load factor comes along in the future. Now, if we figure on a 50 per cent load factor—in other words, taking a cotton factory, such as the South is supposed to be full of, their average rate of use is 12 hours a day. Such a factory would have to pay for guaranteed power, in order to take care of the 5 per cent interest, not exceeding $15 per horsepower.

Senator SMOOT. Then if it runs only eight hours per day it would be a third more, which is $20.

Col. COOPER. No; if it is 8 hours, the kilowatt-hour price would go down with it.

Senator SMOOT. No.

Col. COOPER. Yes.

Senator SMOOT. It would go the other way.

Col. COOPER. No; not at all. If they only use it eight hours, the four hours that they did not use it would be sold to somebody else.

Senator SMOOT. You do not know whether you could do that.

Col. COOPER. If one fellow was doing it, the other fellow would be doing it, by the same economic law.

Senator SMOOT. Suppose there was a law that you could not work the employees in those mills more than eight hours?

Col. COOPER. They would then only pay for the eight hours. You see you could use three 1,000 horsepower units for eight hours, or one 1,000 horsepower unit for 24 hours. That is the advantage of having a dam with storage.

Senator SMOOT. Yes; but on your theory the machinery and everything is there for the full time, and it seems to me that the less hours you run the higher the cost will be, unless you have somebody to take the power right up and go on with it and use the other four hours or eight hours.

Senator UNDERWOOD. I am assuming, as a basis of my question, that this power could be sold.

Col. COOPER. Yes.

Senator UNDERWOOD. To make it clearer, as soon as the dam can run on a 10 or 12-hour basis a day for 310 days a year, which excludes Sundays, what could the Government sell the power for at the dam without losing money, assuming that it found a consumer, where you were running on an estimate of a 10-hour day or a 12-hour day, whichever you think is wise.

Col. COOPER. I think a conservative point is 12 hours, and that would be at $15 a horsepower.

Senator UNDERWWOD. It can sell it at that and pay 5 per cent interest?

Col. COOPER. Yes.

Senator UNDERWOOD. Is that high or cheap power?

Col. COOPER. It is cheap.

Senator SMOOT. Very cheap. In fact, if you could get horsepower at $15 you could redeem the deserts of the West.

The CHAIRMAN. Is the nature of the construction such that you have got to practically complete the project before you can deliver power at all, or can you, with partial completion, commence to deliver power?

Col. COOPER. By the expenditure of $43,000,000 you can make available 25 per cent of the capacity of the plant.

Senator SMOOT. An expenditure of $3,000,000.

Col. COOPER. Yes.

Senator UNDERWOOD. You mean a total of $43,000,000?

Col. COOPER. Yes.

Senator UNDERWOOD. But with the $7,000,000 you can make it all available.

Col. COOPER. Yes.

Senator UNDERWOOD. Because all you would have to install with the other $7,000,000 would be the machinery to consume all the power?

Col. COOPER. Yes.

The CHAIRMAN. I am to understand then that it takes $43,000,000 before it is practicable to deliver power?

Col. COOPER. Yes.

The CHAIRMAN. Does this project have in contemplation secondary power—steam power?

Col. COOPER. The contemplation is to use all of the secondary power that can be possibly used, and I have figured, as I have already stated, that it would take 10 years to market the primary and secondary power.

Secretary BAKER. I think your question probably did not have in mind the fact that there is already there one of the most perfect steam plants in the world, in its economies, and a very large one. It is there, ready to be used.

The CHAIRMAN. But not for the sale of power?

Secretary BAKER. It is there and could be used.

The CHAIRMAN. When you speak of primary and secondary power, please explain that a little.

Col. COOPER. Primary power is the power that is available all the year around, because there is sufficient water to turn the turbines

all the year around. Secondary power is power that is not available all the year around, because of a shortage of water—a greater or less amount.

The CHAIRMAN. In other words, when your load is not up to the maximum you can turn it in part to another use?

Col. COOPER. Yes; it could be used for that, but, on the other hand, supposing you do not have a nitrogen fixation in this at all. All the public utilities in the South have got steam plants that could fill in and make up the shortage of water, and make this secondary power into continuous power.

The CHAIRMAN. You are speaking of the plants now in existence, running by steam power?

Col. COOPER. Yes; so that the Government is protected in either direction which it desires to take. If they want to go into the thing on the basis of Government manufacture of fertilizer, they have got their steam plant on that. If they want to go into power distribution to public utilities, the public utilities have got the steam power in reserve.

Senator OVERMAN. Speaking of this secondary power, have you estimated for the building of storage dams and reservoirs?

Col. COOPER. There are no storage dams possible that would have any practical value to increase the amount of primary power. It might be done 50 years from now, but even then it would be a very small amount.

Senator UNDERWOOD. Colonel, will you explain to the committee the size and length of the dam, its height, and the amount of storage basin, so that they can visualize it?

Senator JONES of Washington. Before he goes into that let me ask him a question.

Senator UNDERWOOD. Certainly.

Senator JONES of Washington. As I understand, Col. Cooper, that when the Government gets this dam completed and the necessary things for the development of power are installed, it will not proceed any further?

Col. COOPER. No further. It will not have to proceed any further.

Senator JONES of Washington. What agency do you think will take it over? It would have to be taken over by one agency, would it?

Col. COOPER. Yes. I think that agency will probably be the five or six or seven public utilities of the South operating under the direction of the Federal Power Commission.

Senator JONES of Washington. Are those public utility companies in existence now?

Col. COOPER. They are.

Senator JONES of Washington. Where and what are they?

Col. COOPER. Birmingham, and the Alabama Power Co., the Southern Power Co., and the York, Pennsylvania interests—a great many of them.

Senator JONES of Washington. You think they would get together and form one company?

Col. COOPER. A distributing company that would get its rate of existence specified, and the cost of selling the power specified in the lease that the Federal Government would execute for the use of this energy.

Senator JONES of Washington. Suppose such an agency as that should not be formed and could not get together. Then the Government would have to maintain it and establish distributing systems and everything else.

Col. COOPER. The supposition that they would not proceed in that line is an economic mistake, because it is to their own interests to do it.

Senator SMOOT. They will do it all right.

Col. COOPER. Oh, absolutely; they will do it, and they are going to do it now.

Senator JONES of Washington. Build a plant?

Col. COOPER. No; but they are wanting to form an association to handle this current under this superpower commission that the Government is back of. This is a good thing. There is nothing in this project, as I see it to-day, that is not a very worthy use of public money. I do not think there is anything about it that can be criticized, if you will just stick to the power end of it.

Senator UNDERWOOD. Will you explain to the committee the size of this dam. I want to get it into the record. I think the committee probably understand it, but I would like to have the record show the size of the dam and lake and the physical properties there.

Senator SMOOT. And the maximum horsepower that can be developed.

Col. COOPER. I have so many of these plants on hand that I have to make a little calculation; but I will say this, with respect to the maximum horsepower that can be developed—and this is very important, because we have got back to the question asked by Senator Jones and other Senators with respect to the reliability of the estimate—we have made an independent test of the quantity of water that passes this point, covering the last 20 years. No engineer or anybody else can tell how much it is going to rain in the future; but based upon the average of 20 years, and a check-up which we have made that is absolutely independent of the work of everybody else, I would like to have the statement go into the record that in my opinion this plant should be developed for 550,000 horsepower.

Senator SMOOT. Has the Geological Survey takes measurements during those 20 years?

Col. COOPER. Yes; many measurements, and the Army have made many measurements, and we have made 45 measurements.

Senator SMOOT. And all of them practically agree?

Col. COOPER. They agree surprisingly well. I do not remember whether there was even 1 per cent of difference. It is on those measurements that I base the statement as to 550,000 horsepower.

Senator SMOOT. How much of that is primary and how much secondary?

Col. COOPER. 100,000 is primary and 450,000 secondary; and 100,000 primary power will produce for commercial use 700,000,000 kilowatt-hours per annum. The amount of kilowatt-hours that will come of a secondary power character will be 1,470,000,000 kilowatt-hours. I think you ought to know that that means 6,500,000 tons of coal per annum saved in that district.

Senator SMOOT. When used.

Col. COOPER. When used. I have figured that it will taken 10 years to get it into commission. This is not a promoter's estimate. I have taken the adverse view and the overconservative view of it altogether.

The CHAIRMAN. In a project of this size, with the amount of primary power which you have, do you consider it good business in the first instance to go on with the development of secondary power as well?

Col. COOPER. That question is answered in this way: We only put in the work for low water at this time. The $7,000,000 is to be put in as and when needed and at the rate that it is needed, so that there is very little of the money required for the secondary power that goes in in the first instance.

The CHAIRMAN. That is, you get the secondary power for a small additional expense?

Col. COOPER. Yes; and the sale price I have figured for the secondary power is only 30 per cent of the primary-power rate. Senator Smoot will agree with me that it is a very low price.

Senator SMOOT. A very fair price, comparatively.

Senator JONES of Washington. Does it cost $43,000,000 to make available 100,000 primary horsepower?

Col. COOPER. Yes.

Senator UNDERWOOD. It would make the other 450,000 secondary horsepower available for an additional expense of $7,000,000 when it was needed?

Col. COOPER. Yes; as and when needed; and it would take 10 years to do that.

Senator SMOOT. That will not give you the additional machinery necessary as well as the building of the dam to hold that much more water, will it?

Col. COOPER. The dam is completed in the first instance.

Senator SMOOT. For all the secondary power?

Col. COOPER. Yes. The dam and all the navigation facilities are all completed for the first $43,000,000.

Senator SMOOT. It would take at least $7,000,000 to put in the machinery?

Col. COOPER. The $7,000,000 covers the cost of the secondary installation.

Senator GRONNA. How long will it take to build the dam for the primary power?

Col. COOPER. I think 36 months yet.

Now, another statement I would like to put in the record is this: It is my belief that the construction of this thing by the Government in the manner that I have recommended will save the power consumers in this 60,000 square miles of territory $10,000,000 a year in power bills. Now, I would say this, that when you get ready to do real business, and decide what you ought to do to this, if you can find a use for this vast amount of energy that will be more profitable than is represented by the saving of the $10,000,000, then I would say go to the other thing; but I would find out, just as you would with private capital, and I would find out the best trade I could make with this thing—and you are in no trading position now.

Senator SMOOT. Can you estimate what it will cost per horsepower per year for the distribution lines from the dam to the place where the power should be used, meaning by that the average; because, of course, those which were close by would not cost as much, and those farther away would cost more. But take an average distance for the seven Southern States, and what would the distribution lines add to the $15 a year per horsepower for the power created at the dam?

Col. COOPER. I think about $12.

Senator SMOOT. Making an average of $27 per horsepower.

Col. COOPER. Yes; which is a good deal less than half the cost by steam.

Senator SMOOT. Yes; I am quite sure it would be.

Col. COOPER. Yes; you can not possibly lose anything.

Senator JONES of Washington. You said that it might be contemplated to furnish this power for certain industries, but after we got it ready for distribution we might find a more attractive proposition presented by other industries and attempt to divert it to that use. What situation do you believe would then arise? Do you not think that you would find these different conflicting interests appealing to their Senators and Representatives to prevent diversion to this other use and all that sort of thing?

Col. COOPER. Of course, I will never be a Senator or public official, but if I were either one I would tell those fellows that I would use my own judgment and they could do what they pleased.

Senator JONES of Washington. I was just asking whether that would not be the result.

Senator SMOOT. You would not get very many votes if you did that.

Senator JONES of Washington. That would cause a whole lot of trouble and would be likely to interfere with the efficiency of the plant.

Col. COOPER. No; I do not think so. You can not change the efficiency of this masonry.

Senator JONES of Washington. Not of the masonry, but you just suggested that you could make $10,000,000 using this in a certain way, and yet some other avenue might open up wherein you could make $15,000,000 a year. If so the chances are you would not go into the $15,000,000 proposition.

Col. COOPER. Yes; I would.

Senator JONES of Washington. You can not run the Government in that way.

Col. COOPER. I think we should carry on all work on the basis of creating the greatest good for the greatest numbers; and if at the end of this thing I found the best I could do as a power proposition for the people of that district was $10,000,000 a year, and I found I could make a benefit of $15,000,000 a year for the people there by using it along certain lines, along chemical lines, or if that benefit of $15,000,000 related not only to the people there but all over the United States, I would put it into the $15,000,000 proposition.

Senator SMOOT. You would if you owned it, or controlled it.

Col. COOPER. I do not see why the Government does not control it.

Senator SMOOT. Oh, well, that is a different proposition.

Senator GRONNA. Are you speaking of the gross or the net profit?

Col. COOPER. The net profit.

Senator GRONNA. So that if the Government invests $50,000,000 in the Muscle Shoals Dam there is a possibility of making $10,000,000 a year profit?

Col. COOPER. To the people down there.

Senator SMOOT. Not to the Government, but to the users of the power in the seven States.

Senator CURTIS. The saving to them.

Col. COOPER. Yes; and at the same time the Government gets 5 per cent interest on the money it has put in. That is the expression of my best judgment.

Senator GRONNA. That the Government would get 5 per cent?

Col. COOPER. Yes; and the people save $10,000,000 in their power bills.

Senator SMOOT. That it would be an average of 5 per cent.

Col. COOPER. Yes.

Senator SMOOT. Not for the first 5 or 10 years.

Col. COOPER. No; that it would average 5 per cent over the time of the lease, that the Government would get its full 5 per cent.

Senator UNDERWOOD. Then the Government would get 5 per cent on its money?

Col. COOPER. Yes.

Senator JONES of Washington. Looking at this from the national defense standpoint, do you think that would justify the Government in putting it in now?

Col. COOPER. Oh, no; I do not think so.

The CHAIRMAN. Col. Cooper, if I understand you correctly, it would not be the purpose to keep this steam power in use for the manufacture of fertilizer or nitrogen, and so on. You would not like to use the secondary power or steam for that?

Col. COOPER. No; I have tried to present this thing to the committee on the basis of what the worst thing is that you can do, that is, the poorest showing you can make, and the one I am talking about would be where the steam plant of the Government would not be called into requisition at all, that the steam reserves would be supplied by the power companies. I have put it on that basis, because it is a basis that I know something about. The fertilizer business I do not know anything about.

The CHAIRMAN. The steam power is there to a large extent already?

Col. COOPER. Yes.

The CHAIRMAN. And the cost of the upkeep is considerable of course, whether used or not used?

Col. COOPER. Yes.

The CHAIRMAN. And your idea is that it would be perhaps some years before it would reach the place where it would be used.

Col. COOPER. Yes; I think so. But if you went before these public utility companies I think you would find that the same trade that leased this hydroelectric energy would take into account the taking care of the steam plant, which is a small amount.

The CHAIRMAN. In other words, that would be behind it as a guarantee or insurance.

Col. COOPER. Yes; I think the two would work very well together, and I think the Government is in a position to guarantee itself against loss and in a position to create very wide benefits by a great number of people.

Senator UNDERWOOD. What is the length of that Muscle Shoals Dam?

Col. COOPER. About a mile.

Senator UNDERWOOD. What is the height?

Col. COOPER. It lifts the water 92 feet.

Senator UNDERWOOD. What is the storage basin behind it?

Col. COOPER. It is about 20 square miles, but we have never figured that the storage basin behind it had any value except for daily peak-power requirements.

Senator UNDERWOOD. But there is a very large storage basin behind it?

Col. COOPER. Yes; a very considerable basin behind it, but we do not estimate that of any value.

Senator UNDERWOOD. Now, as a matter of comparison as showing the availability of this power, you built the so-called Keokuk Dam on the Mississippi River?

Col. COOPER. Yes.

Senator UNDERWOOD. You are one of the officers of that company now?

Col. COOPER. Vice president.

Senator UNDERWOOD. What was the cost of that dam?

Col. COOPER. About $26,000,000.

Senator UNDERWOOD. What was the primary and secondary power there developed?

Col. COOPER. One hundred and twenty-five thousand primary power and 75,000 more secondary power, or 200,000 horsepower primary and secondary, representing an investment of $130 per horsepower; but I would say that the secondary investment at Keokuk is not completed when it is completed our total expense will be in the neighborhood of $150 per horsepower capital account, while in the case of the Muscle Shoals Dam it is less than $100.

Senator SMOOT. In this project it is 100 primary horsepower, and with the Keokuk project it was 125 horsepower?

Col. COOPER. Yes.

Senator UNDERWOOD. This dam will be at least twice as great in its capacity to produce kilowatts as the Keokuk Dam?

Col. COOPER. Two and a half times.

Senator UNDERWOOD. And it will cost at least a third less per horsepower?

Col. COOPER. Yes, sir.

Senator UNDERWOOD. What is the average rate of interest that the Keokuk Dam is able to make on the capital invested?

Col. COOPER. We are not earning on a basis that will tell us that story yet. Up to date we are earning about 6 per cent.

Senator UNDERWOOD. What is the Keokuk power selling for?

Col. COOPER. About $23, on the same basis that we are using here—$23 to $24.

Senator SMOOT. At the dam?

Col. COOPER. No; at the dam it is about $19.

Senator SMOOT. As against $15?

Col. COOPER. As against $15. This is really a cheaper proposition and a better hydraulic proposition than the Keokuk Dam. I have

looked at it many hours, and compared the two one with the other, and I am thoroughly satisfied as to that.

Senator OVERMAN. Where is the Keokuk Dam situated?

Col. COOPER. Across the Mississippi River at the southern boundary of the State of Iowa.

Senator UNDERWOOD. A good deal of that power at the Keokuk Dam you send to St. Louis?

Col. COOPER. Yes, sir.

Senator UNDERWOOD. What is that power sold at in St. Louis?

Col. COOPER. It is sold at about $33.

Senator UNDERWOOD. $33 in St. Louis?

Col. COOPER. Yes; to the central consumer.

Senator UNDERWOOD. And you have no difficulty in obtaining purchasers for the power?

Col. COOPER. None whatever.

Senator UNDERWOOD. You could sell more than you have?

Col. COOPER. Yes.

Senator UNDERWOOD. And you do not think there will be ultimately any difficulty in finding purchasers for this power?

Col. COOPER. I think that it will be all sold.

Senator OVERMAN. Could the Keokuk Co. and the Southern Power Co. of North Carolina get any benefit from this development?

Col. COOPER. No.

Senator SMOOT. Did the Keokuk Dam Co. put in the distributing system? Did they carry that power from the dam to St. Louis?

Col. COOPER. They carried it to the step-down transformer station 14 miles out of St. Louis.

Senator SMOOT. But it was within 14 miles?

Col. COOPER. Yes; within 14 miles. Our distribution sets are 142 miles long.

Senator SMOOT. And this price of $33 per horsepower includes the cost of transmission?

Col. COOPER. Yes; it includes the cost of transmission and local distribution.

Senator SMOOT. And local distribution as well?

Col. COOPER. Oh, yes; in big blocks, not in little blocks.

Senator SMOOT. They are getting cheap power.

Col. COOPER. Yes; they are.

Senator UNDERWOOD. What is the cost of distribution wire, say, 100 miles, for 100,000 horsepower?

Col. COOPER. Do you mean the gross cost of a transmission system?

Senator UNDERWOOD. I do not know whether I express myself correctly, but I should like to have the record reflect what the cost is, not of the aggregate, but what it would cost to build the distribution wires on some unit, so that the Congress will understand.

Col. COOPER. On the basis of 100,000 horsepower distribution and 100 miles of distribution, at the present price of copper, I should say that it would cost, including right of way, somewhere in the neighborhood of two and a half million dollars.

Senator UNDERWOOD. Two and a half million dollars to build the plant to distribute——

Col. COOPER. To build the transmission system to distribute 100,000 horsepower 100 miles away.

Senator SMOOT. That is only the line and the poles?

Col. COOPER. Just the line; yes—that is, the step-up transformers, but not the step-down transformers.

Senator UNDERWOOD. Where you went into a distribution system you would find those already there, would you not?

Col. COOPER. Yes.

Senator OVERMAN. How far can you carry this power?

Col. COOPER. It depends upon the price of the coal with which you have to compete. On the basis purely of scientific achievement, it is quite possible to carry it 400 miles.

Senator SMOOT. We are doing that now.

Col. COOPER. Yes; absolutely; but on the basis of how far you can carry it commercially, it depends upon the price of coal. With coal at $5 a ton or $6 a ton you can go 400 miles, but if you are competing against $2.50 coal, 150 miles is the maximum distribution.

Senator UNDERWOOD. Your final conclusion about the matter is, Colonel, that the dam ought to be completed; that now that it is started, and we have the money in there, it is the economical thing to do to complete the dam?

Col. COOPER. Yes; you will lose $4,000,000 if you do not. I should like to direct the attention of the Senators to this photograph again, because it gives you some idea of what I refer to when I say that if you shut down the plant it will cost you $4,000,000. Here is this vast amount of work distributed over a mile of distance; all these derricks, all these locomotives, all these temporary bridges and temporary cofferdams and all that sort of thing will have to be totally abandoned; and if you shut this plant down now and start it up, say, three years from now, the minimum loss you will have sustained is $4,000,000, without any compensation; and if you sustain the $4,000,000 loss you never can put the plant on a 5 per cent basis in the future.

Senator SMOOT. Unless we sold out entirely.

Col. COOPER. Then you would have a bigger loss yet.

Senator UNDERWOOD. Without asking you to repeat what you have already said, you think it is advisable and the best course for the Government to pursue to complete the dam, and then you feel assured that if it is completed now the Government can undoubtedly receive, either from one source or from another, 5 per cent interest on every dollar that is put into the dam?

Col. COOPER. I so believe. That is the minimum.

Senator UNDERWOOD. That is the minimum that it can receive?

Col. COOPER. Yes, sir.

Senator UNDERWOOD. I believe that is all I want to ask.

Senator JONES of Washington. But you do not expect the Government ever to get its capital out?

Col. COOPER. I certainly would if I were Secretary of War. I would negotiate a contract with this crowd down there to get every dollar of it out.

Senator JONES of Washington. Do you think they could afford to pay 5 per cent interest?

Col. COOPER. At the end of 50 years the price of coal in this country will be such that the next lease that they made would contain an amortization provision that would take care of that thing and wipe it out in 10 years.

Senator JONES of Washington. You think that could be done in about 60 years?

Col. COOPER. Yes; I do not think in this first period there would be any need of amortization at all.

There is only one other thing I want particularly to say to this committee before I sit down, and that is this—that I am not in any way interested in any public utility in the South, and have declined to be at any time, now or in the future. I have kept myself out of a very large amount of prospective business for the sake of this Government and a dollar a year, because I can not possibly be in a position like this: Suppose the recommendation that I have made prevails, and some public utilities down there came across and got the power, and then I joined them on a profit basis; the dirty-minded people could say, "Why, he planned this whole thing as far as he was able to so that these public utilities could get a fat thing out of it." They will never get a fat thing out of it if the Secretary of War and the Federal Power Commission function properly; but I have put myself now and in other ways in a position where never at any time in the future will I accept a dollar's worth of retainer from any power company that will ever have any business relations with this Government.

Senator SMOOT. That cuts you out of seven Southern States?

Col. COOPER. Yes; I have shut myself out of those seven States forever, and I want this committee to know it.

Senator SMOOT. I want to congratulate you upon the fact that the Keokuk Power Co. is selling power delivered at $33 per horsepower, when it is going to cost under this project $27 and more, actual cost at this dam; so you are doing splendid work.

Col. COOPER. We are. We have been complimented, strange as it may seem, by the public-service commissions of a lot of States that formerly thought we were very bad people.

Senator JONES of Washington. Mr. Cooper, do you think the Water Power Commission ought to have the control of the disposal or distribution of this power?

Col. COOPER. I do; no other agency.

Senator JONES of Washington. We ought to have a provision in the bill that is pending, for instance, if it is passed, giving them control?

Col. COOPER. Absolute, exclusive control.

Senator UNDERWOOD. When you answered the Senator's statement about this power costing $27 per horsepower, of course you meant, in answer to that, the cost of the power and distribution both?

Senator SMOOT. Oh, yes.

Col. COOPER. Oh, yes.

Senator UNDERWOOD. I knew it, but I just wanted the record to show it.

Senator SMOOT. I spoke of it, you know, in connection with the power that was distributed by the Keokuk Power Co.

Senator UNDERWOOD. But at that rate, counting the $27 for making the power and distributing it, it is very cheap power, is it not?

Col. COOPER. Oh, yes.

Senator SMOOT. There is no question about it.

Senator UNDERWOOD. Colonel, did you want to say anything further?

Col. COOPER. No.

Senator JONES of Washington. Did you see the amendment which Senator Underwood read into the record, I think yesterday or day before, that somebody suggested should be offered to the pending bill, relating to control by the Water Power Commission?

Col. COOPER. No.

Senator JONES of Washington. Do you know what that was?

Col. COOPER. No; I do not know anything about it. I never heard of it.

The CHAIRMAN. I wish to say to Col. Cooper that the committee are very much obliged to him.

STATEMENT OF HON. OSCAR W. UNDERWOOD, A SENATOR FROM THE STATE OF ALABAMA.

Senator UNDERWOOD. Mr. Chairman, if the committee will indulge me a moment, I just want to make a short statement.

The CHAIRMAN. Proceed.

Senator UNDERWOOD. The amendment pending here in regard to this proposition, as I suggested to the committee, is simply the usual amendment to make the estimate of the Government available as to this particular bill.

Mr. Chairman, I appreciate Col. Cooper's coming before the committee and giving a statement of the case about the dam. His knowledge of this class of work is greater than that of any other man in the United States, especially in reference to this dam. I think the committee can rely on it. I think he has demonstrated beyond a question of doubt that this is one Government endeavor or project that if you complete it the Government does not stand to lose a dollar on; in other words, that the 5 per cent interest can always be surely counted on in connection with this dam, and if the Government chose to sell $50,000,000 of bonds in the future to cover this cost the dam would pay the 5 per cent on the bonds, we would have the water power developed for nothing, and the available control by the Government of the greatest water power in the United States. So it seems to me that it is clear, as a business proposition, that the committee ought to accept and finish the dam.

As to the distribution of power, I should like to see the agricultural interests of this country receive the benefit of this cheap water power—not merely of the South, but of the whole United States. That is my viewpoint, but I do not intend to argue that before the committee, because that is a question that should be decided in another way. If the Congress determines when this dam is built that that is the best way to distribute this great power in the interest of the American people, the Congress will determine that. On the other hand, if the Congress determines that that is not the best way to distribute it, there is no loss of one dollar, because it is clearly shown here that within a reasonable time from the building of this dam every bit of this power can be absorbed at a very cheap rate that will enable the Government to get the absolute return of its money—not merely the 5 per cent, but, on an amortization plan, to get its money back.

Mr. Chairman, it seems to me that as a practical business question it would be absolute folly, after commencing the building of this

dam, with over eleven millions expended and in the dam, and seventeen millions allocated, not to go on and complete the dam on the basis that these engineers have worked it out. More than that, we have got to consider the development of the rivers. Here is a river that is as great as the Ohio, and ultimately will have as great a traffic as the Ohio, and here is the key to it that bottles it from this point in Alabama clear up beyond Chattanooga and up to Knoxville.

When the committee has the opportunity here to secure this result without loss to the Government, on a basis where it is absolutely assured that the Government will receive the interest on its money to pay the interest on the bonds that are issued, and you are going to navigate this great stream, that alone, it seems to me, would more than justify the committee in acting favorably. If, on the other hand, you abandon this appropriation, you will leave it open for the flood tides to wash out this work. It may not be the first flood tide, but if you do not do anything the flood tides are going to wash out this $11,000,000 that is in there, and let it go downstream.

It is clear to my mind that we ought to have a favorable report to grant the money that is necessary, the $10,000,000 to go on with the work this year, and the additional money next year to complete the dam; and I hope very much that the committee will take that viewpoint.

(Thereupon, at 12 o'clock meridian, the subcommittee took a recess until 2.30 o'clock p. m.)

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